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DISCUSSION ON TYPHOID FEVER.
THE MEDICAL TREATMENT OF TYPHOID FEVER.*

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As yet we are not able to speak of a specific treatment of typhoid. We are unable to destroy or counteract the typhoid bacilli, or prevent or even limit the effect of their toxins in the human subject. The results obtained by immunizing and curative inoculations in hydrophobia, tetanus, and diphtheria, have naturally led to a search for similar antitoxic principles in typhoid. Hammerschlag and v. Jaksch have reported a number of cases treated by serum taken from convalescent typhoid patients. Beumer, Peiper, Klemperer, and Levy have obtained a serum by treating dogs with gradually increasing doses of bouillon cultures of typhoid bacilli, which was found sufficient to immunize susceptible animals, such as mice and guinea-pigs. With these measures they were also able to effect a cure some time after infection had been induced. They tried the serum in a few cases of typhoid in the human subject, but with no definite result, except perhaps, to show that it could be used without inducing any unpleasant or dangerous symptoms. Other interesting work of this character has been carried out with the serum of convalescents and immunized animals, but the result, although apparently effective in the disease as it is met with in susceptible animals, still has been disappointing when applied to counteract the disease in the human subject.

In this connection I will refer to a form of treatment which is very old, but has lately been revived by a few physicians in the United States

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and in Canada. I refer to the use of purgatives and intestinal antiseptics. W. B. Thistle, of Toronto, who read a paper on this subject at the meeting of the Canadian Medical Association in this city two years ago, is a strong advocate of this method of dealing with typhoid fever. He highly recommends calomel and salines. He appears to believe that the intestines are, by these measures, swept clear of bacilli, and the further production of toxins prevented. It is claimed for this method that the disease is aborted. Another so-called abortive method of treating typhoid is known as the Woodbridge method. It appears to be a favorite way of dealing with typhoid fever in the Southern and Western States, especially in the country districts. It consists in the administration of podophyllum, calomel, guaiacol, eucalyptol, and menthol, according to some definite formulæ. Many physicians have written claiming abortive power over the disease by this method, but all the reports that I have examined bear the evident stamp of inaccuracy in observation, and are, in consequence, of little or no value. To claim for any drug, either antiseptic or cathartic, that it is capable of destroying or removing all noxious micro-organisms from the gastro-intestinal tract, is simply absurd. As the typhoid bacilli are not present in the intestinal tract prior to the breaking down of the lymph tissues, it is impossible for antiseptics to reach them, except through the blood, and it is, of course, vain to expect that any medicinal agent that we know of can exert a germicidal action on the organism collected in the lymph tissues. Dr. Woodbridge proves too much. He claims, for instance, that in upwards of 8,000 cases of typhoid treated after his method, the average duration of the disease was only twelve and a-half days. Now, as the infiltrated tissue does not commonly break down before the end of the second week, it follows that his remedies have no exposed surface to work their antiseptic action on, hence the action must be through the tissues, a claim which is utterly unworthy of anyone possessing even an elementary knowledge of pathology.

The number of different antiseptics that have been used in typhoid is numerous. The old iodine and carbolic acid combination was for a long time a favorite; at present it is rarely heard of. Calomel, naphthalin, naphthol, iodoform, salol, salicylate of bismuth, boracic acid, chlorine, turpentine, have all been used at one time or another with the idea of producing a specific effect, but there is no evidence to show that any of them, or any combination of them, has any effect in lessening the duration, or to any appreciable degree modifying the severity of the disease.

Of all these agents, calomel is the one that has been the longest and probably the most favourably known. Many physicians believe that

the early employment of a few small doses of calomel have a favorable influence over the course of typhoid. It is not unlikely that after the breaking-down of the lymph structures, its action may help in preventing the development of a secondary infection, but more than this, I think few would claim for it.

THE ANTIPYRETIC TREATMENT.

One of the most noticeable changes in the method of treating typhoid during the past few years is the constantly lessening use made of antipyretic drugs. Ten or fifteen years ago it was the rule, even in hospitals, to use these drugs very freely. Many here may remember the time when it was a common practice to give quinine in very large doses—20 to 40 grains. Following this we have the slavish employment of the synthetic alkaloids, from antipyrine down to the most recent new antipyretic advertised by the manufacturing chemist. Antipyrine, phenacetine and lactophenine are the drugs of this class that are the most frequently employed at present, but they are rarely resorted to in the very full doses that was formerly the practice. To give large doses of any of these to reduce the fever of typhoid is a practice which is fraught with danger, without any compensating advantage whatever. Guaiacol applied externally quickly reduces temperature, but it is open to the same objection as the synthetic alkaloids, inducing, when effective as an antipyretic, marked nervous disturbance, and so, consequently, lessening the resisting powers of the patient.

I will now refer to the treatment of typhoid by systematic cold bathing according to the method of Brand. This method has now been extensively employed for many years in Germany, France, Australia, and on this continent, and with such universally favorable results that it is generally allowed, even by those who do not carry it out in practice, to be the most effective method at present known.

The great superiority of the Brand over other methods of treating typhoid has been so conclusively proven that it seems almost unnecessary to add anything further to the long list of series of cases that have been treated in this way. What is particularly conclusive about the evidence of the value of this treatment is the uniformly favorable results obtained in different parts of the world. "The mortality at the Red Cross Hospital at Lyons amounted to 7.3 per cent., that of Dr. Hare, in the Brisbane Hospital, in Queensland, 7.84 per cent.; that of Osler, in the Johns Hopkins Hospital, to 7.8 per cent.; that at the German Hospital in Philadelphia, under Wilson and his colleagues, to 7.8 per cent. These results are most impressive; they show that in the method of Brand, systematically carried out and applied to successive cases, as they present themselves, we have the means of saving, out of every hundred cases of

the great endemic disease of the present epoch of our civilization, at least seven more lives than by any other plan." (J. C. Wilson, American Text-Book of Applied Therapeutics.) Since the opening of the Royal Victoria Hospital on the 2nd of January, 1894, this method has been the routine treatment of typhoid fever. In the following table the number of cases admitted each year, with the number of deaths and the percentage mortality are recorded.

TABLE I.

CASES OF TYPHOID FEVER ADMITTED INTO THE ROYAL VICTORIA HOSPITAL DURING THE FIVE YEARS ENDING DEC. 31st, 1898.

Year.	Number of cases.	Number of deaths.	Percentage Mortality.
1894.. .. .	84	3	3.5
1895.. .. .	84	4	4.7
1896.. .. .	72	0	0.0
1897.. .. .	75	7	9.3
1898.. .. .	93	4	4.3
Totals.. .. .	408	18	4.4

The bath treatment was carried out in every case where the temperature rose above 102.2° F., except where there was some especial complication, as haemorrhage, or symptoms pointing to perforation.

The following table shows the cause of death in the eighteen fatal cases, with the percentage mortality from each cause:—

TABLE II.

CAUSES OF DEATH IN EIGHTEEN CASES.

	1894.	1895.	1896.	1897.	1898.	Percentage Mortality.
Perforation.. .. .	..	3	..	2	1	1.47
Intoxication.....	1	..	..	2	2	1.22
Haemorrhage.....	1	..	..	1	1	.73
Septico-Pyæmia.. .. .	..	1	..	..	..	.24
Suppurative Cholecystitis....	..	..	..	1	..	.24
Broncho-Pneumonia....	1	..	..	..	..	.24
Abdominal Distension.. .. .	..	..	..	1	..	.24

In our 408 cases we have nine deaths from perforation and haemorrhage, being exactly one-half.

If a large series of cases of typhoid fever treated by measures other than by bath treatment are taken, it is found that perforation and haemorrhage taken together cause only about one-fourth of the total deaths, while under the bath treatment the mortality from these two causes amounts to one-half of the total mortality.

The following table, prepared by Dr. F. E. Hare, late resident Medical Officer of the Brisbane Hospital, shows the modification which has been

imprinted upon the constitution of the typhoid mortality list by the introduction of the bath treatment :—

Causes of death in typhoid.	According to Murchison.	Brisbane	
		Hospital before bath treatment.	Hospital after introduction of bath treatment
Perforation....	3.0	3.0	2.9
Haemorrhage ..	1.4	1.88	1.2
Other causes..	12.8	9.73	3.4
Total mortality, per cent.		17.2	7.5

There is no doubt great difficulty to be encountered in the endeavor to carry out the bath treatment in private practice, but that it is possible to do so, even in remote country districts, the letter of Dr. Gordon, of Alywin, in the November number of the *Montreal Medical Journal*, will, I think, prove convincingly. A good deal has been written about the harshness of the treatment, and, no doubt, many patients complain of it at first, but as a rule, they soon find out that they are much more comfortable after it, and are usually glad to bear with patience the immediate disagreeable effects. It is, of course, impossible to carry out this treatment in private without the assistance of one or two skilled nurses. Portable baths can now be obtained, and, provided the practitioner can obtain the assistance of one skilled nurse, there is no valid excuse for its non-employment.

It is said by some observers that relapses are more frequent after the bath, than after other methods of treating the disease. There is however, no proof of this. It is strange what confusion exists as to the real meaning of relapse in typhoid; and this is the reason for the great discrepancy of opinion as to their frequency, ranging between two and four per cent.

Many include all after-febrile attacks, no matter what their duration may be, under the head of relapses, while others call relapses those exacerbations of pyrexia which occur during the course of the disease. Taking a large series of cases, relapses may, in a rough way, be set down as occurring in from about 3 to 12 per cent. of all. In 325 of the 408 Royal Victoria Hospital cases, where particular pains were taken to closely investigate this point, it was found that relapses occurred in about eight per cent. of the cases. This proportion is exactly the same as in Osler's and Liebermeister's series, and is not any larger than that given by observers in different countries where other plans of treating the disease have been followed.

The reduction of temperature affected by the cold bath although an important factor, is not the chief one in its beneficial effects. The most obvious effects are seen in the nervous, respiratory, and vascular systems.

The marked stimulating effect of the cold on the peripheral nervous system, and reflexly on the nerve centres, is undoubtedly a powerful means in preventing the supervention of a low typhoid state, which is so common a feature of severe cases treated on the expectant plan. Robin has shown that the processes of oxidation are decidedly reduced during the course of this disease. He has further pointed out that the cold bath increases oxidation, there being a distinct increase in the exchange of gases and in the whole process. He considers that the beneficial effects of cold bathing are due to this increase of oxidation, whereby the toxic products of the tissue destruction are reduced to less harmless excretory bodies. Whether the leucocytosis observed after bathing has any influence, has not yet been determined.

THE TREATMENT OF INTESTINAL HAEMORRHAGE.

Intestinal haemorrhage is, next to perforation, the most common alarming symptom in typhoid fever. In our eighteen fatal cases it was the cause of death in three instances (1.6 per cent.) We had in all 13 cases of haemorrhage in the 408 cases (3.18 per cent.) It is not infrequent to meet with concealed haemorrhage. This occurred in a good many cases. A sudden fall in temperature should always be looked upon as suspicious of the occurrence of a haemorrhage, even if no blood appears externally, if there is no other likely cause for the sudden lowering of the temperature, the condition should be treated as one of haemorrhage. Haemorrhage in typhoid fever is frequent enough to constitute it a symptom, rather than a complication. No doubt one frequently sees cases where a slight haemorrhage appears to be beneficial, convalescence setting in apparently soon after its appearance, still it is always wise to take a serious view of even a trifling haemorrhage and to place the patient at once under such measures as are suitable.

In a few cases, haemorrhage from the bowels appears to be a simple oozing from the blood vessels. In cases of profound toxic poisoning, the blood breaks down and finds its way out of the vessels without any special lesion of continuity of the vessel walls. Even severe losses of blood may not be attended by fall of temperature, as much as 80 ounces in three days having been lost without affecting the temperature. In dealing with haemorrhage it is important to lessen the amount of nourishment given by the stomach, or wholly stop feeding except by the rectum. The foot of the bed should be elevated and a Leiter's metallic coil applied to the abdomen. There is no remedy to be compared with opium. It should be given in doses sufficient to cause either slight drowsiness or contraction of the pupils. It is often a difficult point to decide how far it is advisable to push opium in these cases. The reaction following the effect of large doses, given for some days,

may be very considerable. In one case it looked as if such a deleterious after effect of opium were manifest. A man, aged 31, was admitted in October, 1897, on the ninth day of the disease, in a very apathetic state. Between the 27th and 28th of October, he had repeated haemorrhages, the loss it was computed, being upwards of 83 ounces, but after the 28th there was no further bleeding. On the 28th the abdomen was distended, and the distension continued to slowly but gradually increase, day by day, up to November 4th, when he succumbed, death apparently being due to the very great distension. After death, numerous ulcers were discovered in the lower ileum, caecum, and ascending colon, but in no instance had perforation occurred. The source of the previous bleeding could not be traced.

The practice of giving astringent drugs, like iron, tannic acid, turpentine, etc., is, fortunately for the patient, becoming less and less frequent. Whether ergotine, hypodermically, has any influence in checking intestinal bleeding, I am unable to say.

THE TREATMENT OF PERFORATION.

When perforation occurs, the sooner the case is transferred to the surgeon the better. It is no doubt possible for spontaneous recovery to take place, but it is too rare an event as compared with the result following early operation, to be for a moment considered. The result of operation, considering the gravity of the condition for which it is performed, must be looked upon as most gratifying. Keen has collected 83 cases with 18 recoveries, a result which justifies interference in every case where the condition is recognized. Here, however, we meet with great practical difficulties. The so-called typical symptoms of perforation, were, in most of our cases, conspicuous by their absence. Perforation may occur in persons extremely ill, without any pain, tenderness, distension, rigidity, or vomiting, and it may be found at the post mortem without having been suspected during life. Again, the symptoms may be developed very slowly, where a patient is stuporose from the intoxication of the disease, deep-seated tenderness and a gradually increasing abdominal distension may be the only signs. In several cases I have noticed symptoms of the same character without any perforation, recovery having taken place afterwards.

Peritonitis may be set up in typhoid from other causes than from perforation, and I believe this to be a more common event than is generally believed. I believe I have met with several instances of a more or less generalized peritonitis where recovery took place.

THE DIET.

There is an almost universal agreement as to the best way of feeding typhoid patients, but now and then one reads in medical journals about

pleas for a more liberal feeding than is usually the custom, some going so far as to advocate the administration of solid food, not alone in early convalescence, but even during the active course of the disease. Barr, of Liverpool, and Fred Shattuck, of Boston, have recently urged very cogently for a more liberal feeding of typhoid patients. Dr. Shattuck, for upwards of five years, has been allowing his typhoid patients a more liberal diet, and with, as he says, satisfactory results. The tendency to relapses, to perforation, and to haemorrhage, he finds not increased. He does not advocate an indiscriminate diet, but feeds his patient with reference to his digestive power, rather than solely or mainly with reference to his fever. In addition to the ordinary diet he often allows either soft-boiled or raw eggs, finely minced or lean meat, scraped beef, the soft part of raw oysters, soft crackers with milk or broth, soft puddings without raisins, soft toast without crust, wine jelly, apple sauce, etc. Cases are not infrequent where fever persists for some days after convalescence has been established, the temperature keeping up from weakness and impoverished blood, rather than from the persistence of local lesions. In such cases, appropriately called "starvation fever," a more liberal diet is soon followed by the establishment of health.

